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EDITOR'S NOTES

Elizabeth A. Little

Although the *Bulletin of the Massachusetts Archaeological Society* is an edited journal, the articles are not generally peer-reviewed in the sense that implies subject to scholarly criticism. Sometimes your editor interprets the word 'peer' in the sense of English common law, as, for instance, in a jury of one's peers. In areas of archaeology where I feel competent, I correct errors, make suggestions for improvements and reject claims lacking any evidence. On the other hand, if I do not have a strong working knowledge of an area, such as statistics, geology, Massachusetts Archaeological Society history, etc., I call on experts for help. From time to time I like to acknowledge the assistance and advice given by scholars and other knowledgable people. Thank you very much: Charles Bartels (MAS), Dena F. Dincauze (UMass-Amherst), John D. C. Little (M.I.T.), Barbara Luedtke (UMass-Boston), Thomas Lux (MAS), Robert N. Oldale (USGS), Brona Simon (MHC). My warmest thanks for sharp eyes and editorial suggestions go to Bill Moody, Kathryn Fairbanks, Marie Eteson and Wendy Cook.

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BIFURCATE BASE PROJECTILE POINTS IN EASTERN AND CENTRAL MASSACHUSETTS: DISTRIBUTION AND RAW MATERIALS

Eric S. Johnson

Analysis of museum and private collections during the 1980s has significantly enlarged the known sample of Early Archaic Bifurcate Base points and associated site locations within Massachusetts. Site location data suggest settlement patterns similar in some respects to those of later periods. All recorded site locations were occupied subsequently and a variety of habitats were utilized, suggesting a multi-site seasonal settlement system. Raw materials used in the manufacture of the points include both exotic cherts and locally available materials, consistent with a long-term trend of decreasing utilization of exotic lithics from the Paleo-Indian period through the Middle Archaic.

Introduction

The Early Archaic period in the northeast has been defined relatively recently and is only now beginning to be better understood. In eastern North America, this period (ca. 10,000 to 8,000 B.P.) (Snow 1980:159), is characterized by several distinct projectile point varieties (Broyles 1966, 1971; Chapman 1976, 1977; Coe 1964; Tuck 1974). In Massachusetts, the most commonly identified of these, perhaps because of its distinctive shape, is the Bifurcate Base point--the subject of this report.

The goals of this study are twofold: first, to examine the density and distribution of Bifurcate Base sites in eastern and central Massachusetts; second, to describe patterns of lithic resource use observed in a sample of Bifurcate Base points and to compare these with earlier and later patterns. The study is based on data from archaeological literature, site files of the Massachusetts Historical Commission (MHC), and recent inventories of archaeological collections conducted by the MHC's prehistoric survey (Johnson and Mahlstedt 1984a; Johnson 1992).

The Data Base

Figure 1 shows the distribution of the 120 Bifurcate Base points reported in the archaeological literature and in the site files of the MHC up to 1984 (see References to Sites: Table 1). One of the site locations illustrated, the Titicut district, from which several separate sites have yielded at least 86 Bifurcate Base points (Taylor 1976a), is shown as a single locus for ease of presentation.

Figure 2 illustrates the distribution of the 94 Bifurcate Base points identified from at least 45 sites (Table 2) in collection inventories (Blanke 1981; Johnson and Mahlstedt 1982, 1984b, 1984c, 1985; Mahlstedt 1986; Massachusetts Historical Commission 1981, n.d.). There is very little overlap between the two data sets. Only at two sites (Wapanucket and Titicut) were a total of 17 points inventoried from collections that may have also been reported in the literature. The distribution from published sources largely reflects the intensive excavations, collecting activity and extensive reporting of the Massachusetts Archaeological Society in the Titicut district and southeastern Massachusetts, and the work of William Taylor, who meticulously collected information on Bifurcate Base points from the Taunton Basin

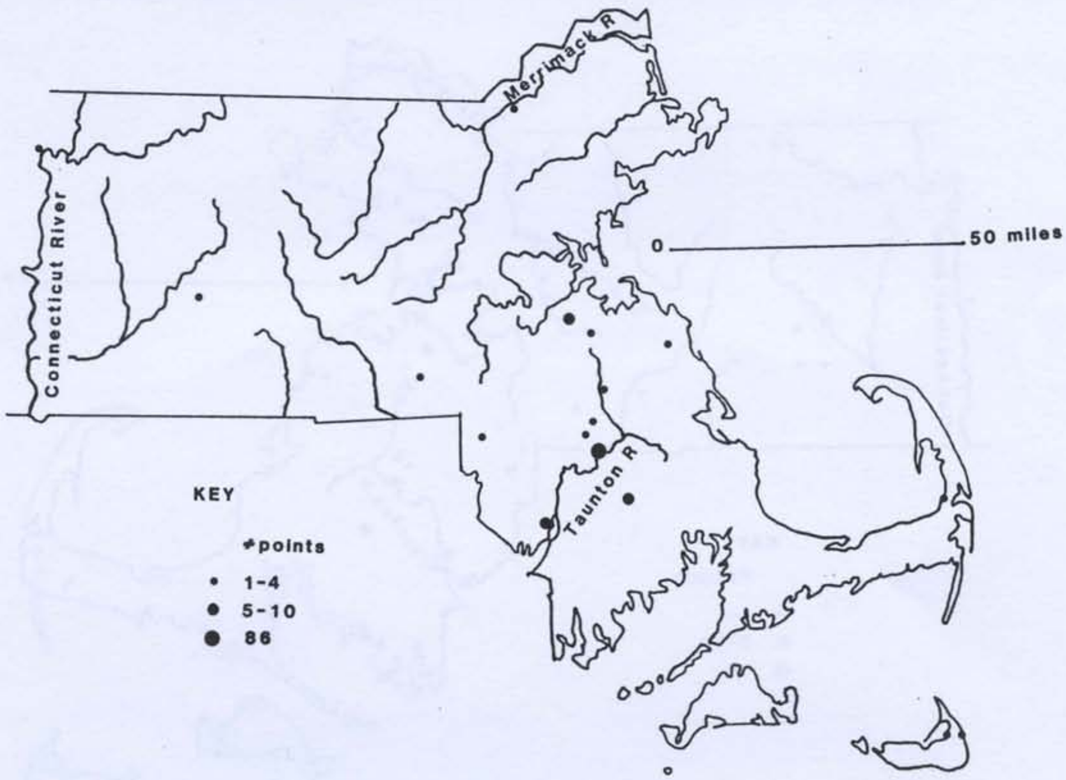

Figure 1. Distribution of Bifurcate Base points reported in the literature and MHC site files.

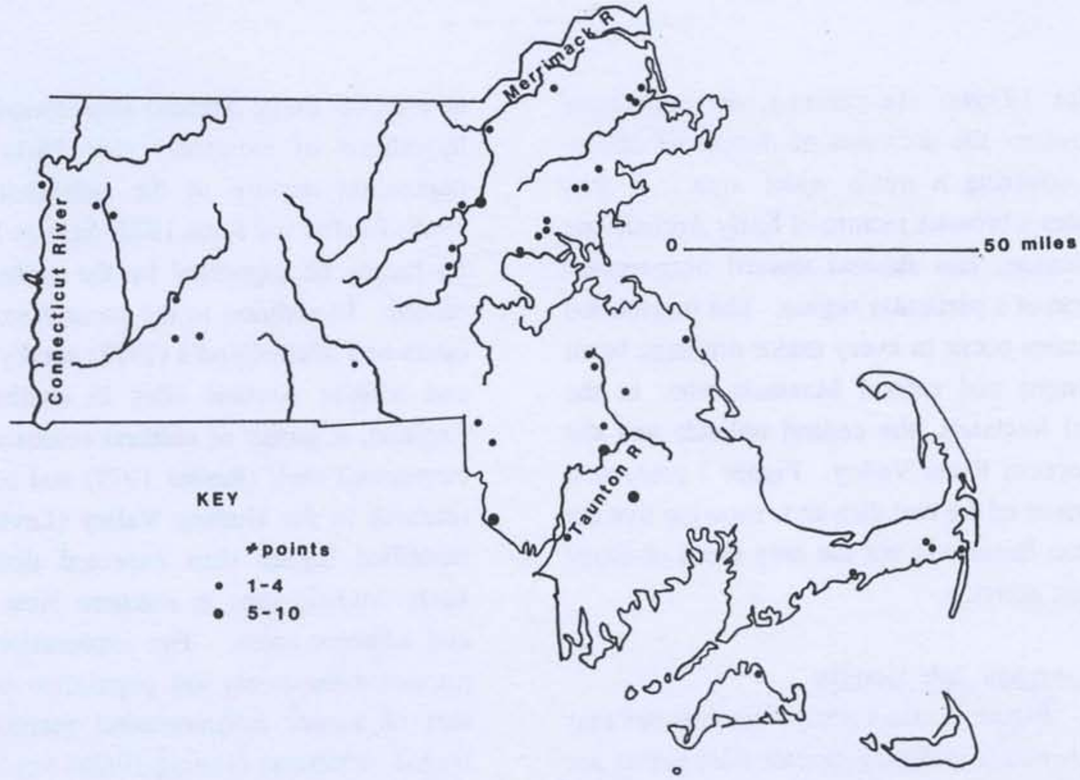

Figure 2. Distribution of Bifurcate Base points inventoried in collections research.

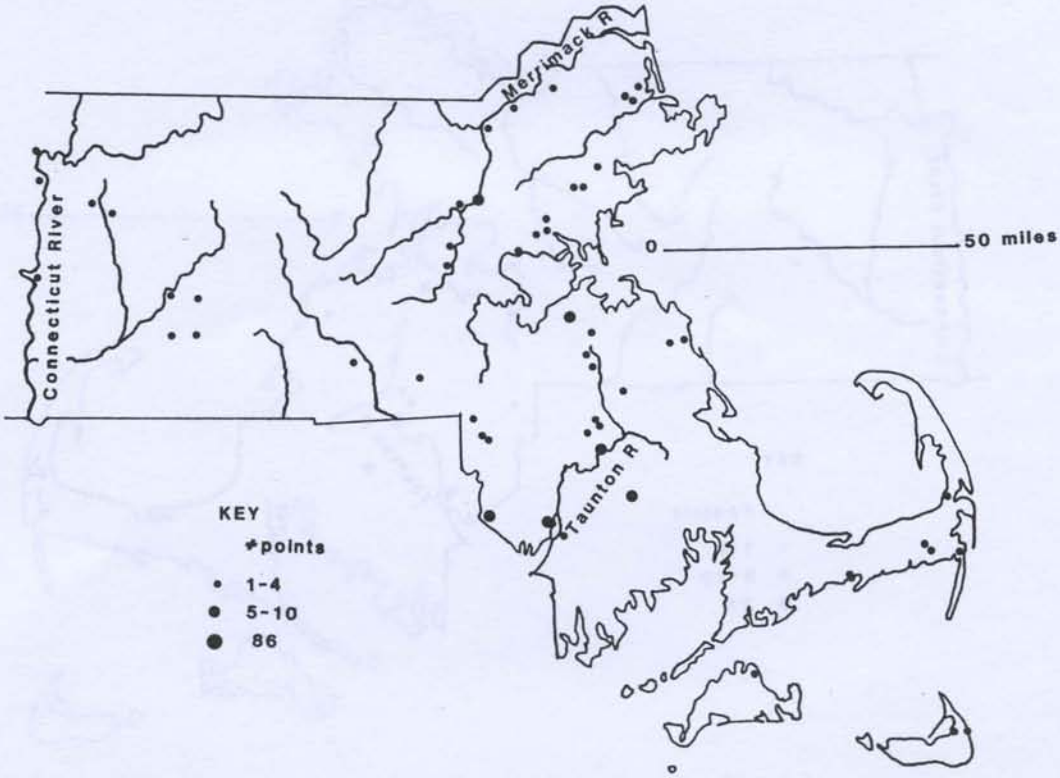

Figure 3. Distribution of Bifurcate Base points from the archaeological literature, MHC site files and collections research.

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(Taylor 1976a). In contrast, the collections data reflect the activities of dozens of collectors, covering a much wider area. It thus provides a broader picture of Early Archaic site distribution, less skewed toward over-representation of a particular region. The inventoried Bifurcates occur in every major drainage basin in eastern and central Massachusetts: in the coastal lowlands, the central uplands and the Connecticut River Valley. Figure 3 presents a composite of the two data sets, showing that the Taunton Basin was not the only focus of Early Archaic activity.

Early Archaic Site Density

Figure 3 also clearly demonstrates that sites that have yielded Bifurcate Base points are not as rare as was once believed. The total of at least 65 Early Archaic sites shows that the hypothesis of extremely low Early Archaic population density in the northeast (Fitting 1968; Ritchie and Funk 1973; Salwen 1975) can no longer be supported by the archaeological record. In addition to the present study, Dincauze and Mulholland's (1977) survey of Early and Middle Archaic sites in southern New England, a survey of cultural resources on the continental shelf (Barber 1979) and collections research in the Hudson Valley (Levine 1989) identified higher than expected densities of Early Archaic sites in southern New England and adjacent areas. The explanation for the presumed extremely low population densities--that of severe environmental restrictions on human settlement (Fitting 1968)--has also been effectively disputed in light of recent paleoenvironmental studies (Davis 1969; Dincauze and Mulholland 1977; Fagan 1978; Nicholas 1986, 1987).

Early Archaic Site Locations and Settlement Patterns

The new data also offer some evidence of functional diversity among sites, which is suggestive of a multi-site seasonal settlement system, such as that of the later Archaic periods. Evidence of functional diversity among Middle Archaic sites has been suggested on the basis of variability among artifact assemblages (Dincauze and Mulholland 1977; McManamon 1980). However, such an approach is not possible for the Early Archaic using the present data base. These site assemblages are, for the most part, surface collected from disturbed contexts at multicomponent sites and it is impossible to separate out tools, artifacts and features associated with the Early Archaic components. In this case, site location data are the best avenue for investigating diversity in site functions.

Given a multi-site settlement system geared to the exploitation of different seasonally abundant resources, such as characterized later cultures in the region, the set of known Early Archaic sites should include a diversity of environmental settings associated with a variety of different landforms, water bodies and habitats. Although these settings may have changed, sometimes dramatically, during the last 8,000 years, we can infer their general characteristics and examine the range of variability.

Site locational data indicate that Early Archaic sites are located in a variety of environmental settings. Many are situated along the channels of important regional waterways such as the Merrimack (site 19-ES-219) and Taunton (Titicut district) rivers; often these riverside locations are near confluences with large or small rivers such as the confluence of the Assabet and Sudbury Rivers in Concord. The margins of large bodies of open water such as Assawompsett Pond (Wapanucket site), Quaboag Pond and Lake Cochichewick in North Andover have also yielded Early Archaic materials. Several sites are located at the edges of present-day swamps or marshes which may have been open water at the time of occupation: for example, the Double P and Nunkatusset sites, or the sites around the Great Meadows in Concord. A number of Bifurcate Base points were found in association with smaller water bodies such as tributary rivers like the Bungay River, and small brooks (e.g., Naultaug Brook); a few sites are located at or near the headwaters of these smaller watercourses (Mill River Site). Finally, a few Bifurcate Base points have been found in areas not associated with water bodies any larger than springs (Turkey Hill site, 19-ES-103).

The diverse settings in which Bifurcate Base points have been found suggests that different locations were occupied in order to exploit different resources as early as the Early Archaic period. It is also worth noting that those locations yielding Early Archaic materials invariably contained later Archaic components as well. This association, also reported in the continental shelf survey suggests "a basic continuity of settlement pattern through the Archaic period" (Barber 1979:207). Whether the pattern exhibited by the Bifurcate Base sites does, in fact, reflect a multi-site seasonal settlement system can best be confirmed by studying Early Archaic assemblages, features, faunal and floral remains where available, and other environmental data.

Patterns of Lithic Raw Material Use

In the course of the collections inventories, raw materials were recorded for projectile points and other flaked-stone tools. Material identification was based on macroscopic characteristics such as color and texture and was undoubtedly somewhat imprecise (cf. Calogero 1992). In general, however, the raw material classifications are precise enough to distinguish most exotic materials (those materials whose sources lie outside the study area) such as New York cherts and Pennsylvania Jasper, from materials of local or regional origin such as quartz, quartzites, a variety of volcanics commonly referred to as "felsites" or "rhyolites" and argillites. The raw material categories also have the advantage of being explicitly defined (Johnson and Mahlstedt 1984a:217-230) and consistently applied to a large body of data (94 Bifurcate Base points). In contrast, information on raw materials from published sources is usually absent, and where present suffers from poorly-defined descriptors and lack of consistency and comparability among reports.

The inventoried sample shows that people were familiar with regional lithic sources during the Early Archaic, at least in eastern and central Massachusetts; 72 points (c. 77% of the sample) were manufactured on materials known or presumed to be from sources within the study area. The most common of these lithics are varieties of regional volcanics, most of which were probably derived from sources in the Lynn, Mattapan and Newbury volcanics complexes, or from glacial sediments. These comprise c. 69% of the inventoried sample and include grey, black, and maroon porphyritic "felsites," "red banded felsite" and "hornfels." Nine specimens were manufactured on a distinctive material known as "Attleboro Red felsite," which has a source in southeastern Massachusetts (Johnson and Mahlstedt 1984a: 226; Pagoulatos 1992; Strauss and Murray 1988). Four Bifurcates manufactured on quartzites and single specimens of quartz, schist and argillite complete the inventory of materials of presumed local/regional origin (Table 2).

Materials from sources outside of eastern and central Massachusetts include several varieties of cherts. Bifurcate Base points made from exotic lithics are nowhere exceedingly numerous; they comprise approximately 23% of the inventoried sample. However, exotic materials do appear in the Early Archaic assemblages from every major eastern and central Massachusetts drainage basin.

The overall pattern of Early Archaic lithic resource use that emerges from the inventory data is one of familiarity with and reliance on regional lithic sources, supplemented with occasional exotic materials. The small but significant proportion of exotic lithics in this sample fits into a trend of decreasing reliance on exotic lithic sources during the first 5-6,000 years of human occupation in eastern and central Massachusetts. Eastern Massachusetts Fluted points of the preceding Paleo-Indian period are manufactured primarily (ca. 100%) of exotic cherts (Grimes 1980; Robbins 1980:-156), although a few specimens made of regional volcanics, quartzite and quartz have been reported or inventoried. Bifurcate Base points of cherts and other exotic lithics comprise 23% of our Early Archaic sample. Projectile points associated with the succeeding Middle Archaic period, such as Amoskeag, Stark-like and Neville-like varieties, are manufactured almost exclusively of locally or regionally available materials; of a sample of 259 Stark-like and 193 Neville-like points inventoried in collections from the Merrimack River and North Shore drainages, we found only seven points made of cherts or other exotics, at most 5% of the total. In addition to a higher percentage of local and regional sources in the Middle Archaic, a much wider range of regional lithics were utilized including many varieties of argillites and quartzites. This trend of decreasing use of exotic lithics may reflect a decline in long distance

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contacts, changes in the nature of territoriality or other aspects of human social and economic interaction.

Conclusion

The past twenty years have witnessed an enormous increase in our knowledge about the Early Archaic period, not just in Massachusetts, but throughout eastern North America. Much of this new knowledge has come from new techniques of excavation, the painstaking recovery and recording of data from precise archaeological contexts. Other important information has come from increasingly sophisticated studies of ancient environments and landforms. Still other important contributions have come from theories about human society, especially hunter-gatherer societies--how they operate, how they interact with their natural and social environments, and how they can change. In addition, as this study demonstrates, the information collected (often many years ago) by amateur archaeologists, can, if properly recorded and curated, contribute in important ways to our knowledge of this remote time period.

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Table 1: Published or MHC site File References to Bifurcate Base Points

point #	site	site#	name/location	raw material
1	19-BN-416	1	Herring River	
2	19-BR-10	2	Bungay River	Felsite Red
3	19-BR-98	3	Boats	Quartzite
4-7	19-BR-98		Boats	
8	19-ES-219	4	Merrimack R, Andover	
9	19-FR-12	5	Mackins	
10-15	19-NF-39	6	Ponkapoag	Felsite
16	19-NF-159	7	Gill Farm	Felsite Grey
17	19-NT-47	8	Quidnet	
18	19-NT-162	9	Eatfire Spring	
19	19-PL-49	10	Oak Island	
	Titicut District			
20-32	19-PL-161	11	Titicut	
33-76	19-PL-162	12	Seaver Farm	
77-94	19-PL-163,164	13,14	Fort Hill and Ft Hill Field	
95-101	19-PL-165	15	Taylor Farm	
102-105	-	16	Heinz Farm	
20-105	total	11-16		"90% Felsite" "1 or 2 Quartzite" "10% Chert"
106	19-PL-166	17	Nunkatusset	
107-116	19-PL-203	18	Wapanucket	9 Felsite 1 Chert
117	19-PL-343	19	Double P	Felsite Grey
118	19-WR-110	20	Mill River	
119	19-WR-335	21	Howes	
120	EBRL02	22	Leland Farm	Felsite Yellow

References to Sites
1. Chase 1983 2. Barton 1966 3. Rose 1965; Fowler 1968, 1970
4,5. MHC n.d. 6. Martin 1977 7-9. MHC n.d. 10. Scothorne 1968
11-16. Dodge 1962; Fowler 1974; Robbins 1967; Taylor 1974, 1976a, 1976b
17. Engstrom 1951 18. Robbins 1980; Taylor 1976a 19. Simon 1983
20. Roop 1963 21. MHC n.d. 22. Taylor 1976a

Table 2: Inventoried Bifurcate Base Points

point #	site	site#	location	raw material
1	19-BN-190	1	Salt Pond Bay	Felsite Grey
2	19-BN-517	2	Herring River	Chert Grey-Brown
3	19-BN-519	3	Herring River	Felsite
4	19-BR-4	4	Ten Mile River	Chert Green
5	19-BR-8	5	Ten Mile River	Felsite Red Banded
6	19-BR-75	6	Runnins River	Felsite Porphyritic
7	19-BR-75		Runnins River	Felsite Porphyritic
8	19-BR-75		Runnins River	Felsite Grey
9	19-BR-75		Runnins River	Felsite Grey
10	19-BR-75		Runnins River	Felsite Red
11	19-BR-75		Runnins River	Felsite Maroon
12	19-BR-75		Runnins River	Quartz Milky
13	19-BR-75		Runnins River	Argillite Black
14	19-BR-106	7	Taunton River	Felsite
15	19-BR-108	8	Taunton River	Felsite
16	19-BR-108		Taunton River	Felsite Red
17	19-BR-108		Taunton River	Felsite Red
18	19-ES-80	9	Bull Brook	Felsite Maroon
19	19-ES-80		Bull Brook	Chert Green
20	19-ES-103	10	Rowley River	Felsite Blue-Grey
21	19-ES-306	11	Kimball Brook	Chert White
22	19-FR-236	12	Swift River	Chert Grey
23	19-FR-236		Swift River	Chalcedony
24	19-HS-275	13	Connecticut River	Chert Banded
25	19-MD-81	14	Concord River	Chert Black
26	19-MD-81		Concord River	Felsite Black
27	19-MD-81		Concord River	Felsite Grey
28	19-MD-81		Concord River	Felsite Porphyritic
29	19-MD-86	15	Great Meadows	Chert Green
30	19-MD-103	16	Assabet/Sudbury R	Felsite
31	19-MD-207	17	Heard Pond	Felsite
32	19-MD-207		Heard Pond	Felsite Black
33	19-MD-262	18	Mystic & Alewife R	Felsite
34	19-MD-262		Mystic & Alewife R	Felsite
35	19-MD-332	19	Charles River	Felsite Grey
36	19-MD-388	20	Sudbury River	Felsite Grey
37	19-MD-388		Sudbury River	Felsite Grey
38	19-MD-388		Sudbury River	Quartzite White
39	19-MD-427	21	Mill & Saugus R	Felsite Black
40	19-MD-439	22	Mill R headwater	Chert Black
41	19-PL-24	23	North River	Felsite Green
42	19-PL-24		North River	Felsite Grey
43	19-PL-153	24	Town River	Felsite Grey
44	19-PL-153		Town River	Felsite Black
45	19-PL-161	25	Taunton River	Felsite Red
46	19-PL-161		Taunton River	Felsite Red
47	19-PL-161		Taunton River	Felsite Red
48	19-PL-161		Taunton River	Felsite Black
49	19-PL-161		Taunton River	Felsite Cream and Rust Stained
50	19-PL-161		Taunton River	Felsite Grey
51	19-PL-161		Taunton River	Felsite Porphyritic
52	19-PL-203	26	Assawompsett Pond	Chert Grey
53	19-PL-203		Assawompsett Pond	Chert Grey
54	19-PL-203		Assawompsett Pond	Chert Grey
55	19-PL-203		Assawompsett Pond	Felsite
56	19-PL-203		Assawompsett Pond	Felsite Grey
57	19-PL-203		Assawompsett Pond	Felsite Grey
58	19-PL-203		Assawompsett Pond	Felsite Grey
59	19-PL-203		Assawompsett Pond	Felsite Porphyritic
60	19-PL-203		Assawompsett Pond	Felsite Red
61	19-PL-203		Assawompsett Pond	Quartzite Grey
62	19-PL-372	27	Monponsett Pond	Felsite Grey

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Table 2 (continued)

63	19-PL-460	28	Shumatuscacant R	Chert Black
64	19-PL-466	29	Shumatuscacant R	Schist
65	19-WR-47	30	Ware River	Hornfels
66	19-WR-47		Ware River	Felsite Red
67	19-WR-66	31	Naultaug Brook	Chert
68	19-WR-295	32	Ware River	Chert Green
69	19-WR-283	33	Quaboag Pond	Felsite
70	19-WR-383	34	Swift River	Quartzite Tan
71	ARLNS08A	35	Spy Pond	Felsite Porphyritic
72	BRNL05	36	Hyannis Area	Chert Black
73	BRNL05		Hyannis Area	Chert Grey
74	CC		Cape Cod	Felsite Red Banded
75	CHACC37	37	Chatham	Felsite Porphyritic
76	CONL30		Concord	Felsite Green
77	DEE	38	Deerfield	Chert Black
78	EBRL01		E Bridgewater	Felsite Maroon
79	GLOL06	39	Gloucester	Chert Grey-Brown
80	LOWME	40	Lowell	Felsite Grey
81	LOWME		Lowell	Felsite Grey
82	LOWME		Lowell	Felsite
83	LOWME		Lowell	Chert
84	MDFL03	41	Mystic Lakes	Felsite Black
85	MID		Middleboro	Jasper Brown
86	NADL02	42	Lk Cochichewick	Felsite Grey
87	NADME	43	Shawsheen R	Felsite Black
88	OAK	44	Oak Bluffs	Felsite
89	PEAL01		W Peabody	Felsite Black
90	STDUN1		Essex County	Felsite Black
91	STUN6B		Central Mass So	Felsite Black
92	STUN6B		Central Mass So	Felsite Green
93	STUN6B		Central Mass So	Quartzite
94	SUTBL	45	Sutton	Felsite Red

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[Erratum: The word 'pendulum' should read 'pendant' in the last line on page 3 of the article by Russell H. Gardner, "A Rare Aboriginal Artifact from Martha's Vineyard Island, with a Living Family History," in the *Bulletin of the Massachusetts Archaeological Society* 54:3 (1993).]
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LITHIC SOURCE ANALYSIS IN NEW ENGLAND

Barbara E. Luedtke

Surely everyone who has ever done archaeology has found stone tools that were not made of locally available stone, and has wondered about the source of that raw material. Archaeologists have long recognized that the sourcing of lithic raw materials can provide information about trade and exchange networks, territory sizes and locations, social differences marked by differential access to certain raw materials, and other topics that are otherwise difficult to examine archaeologically. While we all agree on the value of lithic source analysis to archaeology, we are still in a period of transition with regard to our methods for determining sources of artifacts, as we shift from the more casual and impressionistic methods used in the past to systematic methods such as petrographic and geochemical analysis. The varying approaches used in a recent book on lithic raw material use (Ellis and Lothrop 1989) illustrate this transitional state quite nicely.

Some archaeologists are resisting this transition because they believe that sources can be identified perfectly adequately on the basis of macroscopic or easily visible properties such as color, texture, and inclusions. Source identifications based solely on this method, sometimes referred to as "eyeball analysis," are very common in the archaeological literature and are often used uncritically by other archaeologists who are attempting to synthesize regional data or test hypotheses. Again, the articles in Ellis and Lothrop (1989) illustrate this phenomenon especially well. Eyeball analysis alone is tricky anywhere in the world, but it is especially dangerous in New England because of the particular characteristics of many New England lithic materials. In this paper I will discuss some of the reasons we should not rely too heavily on eyeball analysis, and will then make several suggestions to help improve the process of lithic sourcing in New England.

The first difficulty with eyeball analysis is one we share with archaeologists everywhere, and it is simply the fact that we all learn to recognize lithic types through an unsystematic learning process that does not include any tests to verify the accuracy of our learning. For most of us, this learning process began on our first dig when we heard more experienced archaeologists commenting, "Oh, that's Onondaga chert", or "Nice flake of Saugus jasper!" If we were curious and asked how they knew what it was, they probably answered by pointing out key characteristics of the material. Once we began leading our own digs, we probably invited experienced lithic material identifiers to look at our assemblages and tell us what they saw. We also started accumulating samples of different lithic materials, and began to build up type collections. Gradually, we began to feel more and more comfortable with our source identifications, and people began asking us to look at their assemblages. Now when we look at an assemblage from our region, we confidently identify most of the lithic raw materials present. We have undoubtedly created a source typology that is detailed and internally consistent, but all along the only external check on the validity of this typology has been the casual comments of our colleagues. In other words, the relationship be-

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tween our typologies and geological reality is completely untested and unknown.

Furthermore, there is evidence that our source typologies are not as good as we think they are. Barbara Calogero has demonstrated that different archaeologists' eyeball identifications frequently do not agree with each other or with identifications based on petrographic analysis (Calogero 1992). David Ives used to humble Midwest archaeologists with his "Ives Test for the Visual Identification of Chert Sources", which consisted of a small collection of Midwest chert samples that he took to conferences and challenged archaeologists to identify correctly. Virtually none could (Ives 1985:-1). Some years ago I performed an experiment in which I asked a trio of skilled and experienced New England lithic analysts to identify a series of quarry samples I'd accumulated, representing fairly common New England materials. They identified only 58% of the samples correctly (Luedtke 1980).

These results do not mean that these lithic analysts actually misidentify 40% of the artifacts they look at. Every lithic raw material has a range of variation, usually including a "typical" form that is most abundant or distinctive, along with rarer and less characteristic variants. Eyeball analysts usually do very well with the typical forms of a lithic raw material, which make up the vast majority of most assemblages, and make most of their mistakes with the less common variants. Examples of such mistakes include classifying what is actually a variant as a separate type, or not realizing that two material types overlap in their visual characteristics. In the context of an entire assemblage made predominantly of a particular material type, that type's rare variants will probably be identified correctly. However, if one of these variants appears in low proportions or as an exotic in an assemblage, it is likely to be misidentified.

This brings me to the second difficulty we share with lithic source analysts everywhere; we consistently underestimate the full range of variability present at lithic sources. This is partly because we tend to be too reliant on small type collections of only a piece or two per source, often composed largely of small fragments other archaeologists have given us from their own type collections. Very few of us actually check out the quarries or outcrop areas for ourselves, and thus we fail to discover how much variation exists.

Why don't more of us visit the quarries? Largely because of the third problem we share with archaeologists everywhere; there is not enough information in print on lithic sources and quarries. Some have not been found yet, and many others are known but not published. Even those sources that have made it into the archaeological literature are usually not thoroughly described there. Quarry sites tend to produce tons of debitage and not much else, and most archaeologists who have the choice prefer to excavate other types of sites.

So far I have been discussing problems shared by archaeologists everywhere, such as over-reliance on visually based sourcing methods, lack of appreciation for the variability present within most lithic raw materials, and lack of data on the lithic sources themselves. Beyond these problems, those of us interested in lithic source analysis here in New England must contend with some additional handicaps not present in all other regions.

First, it is often surprisingly difficult to identify what kind of rock we are dealing with (Calogero 1992). In many parts of the world virtually all artifacts are made of chert or obsidian, both of which are usually quite easy to identify as to rock type, if not as to source. Here in New England we are faced with artifacts made from a bewildering variety of igneous, sedimentary and metamorphic rocks, many of which overlap visually and some of which cannot be easily identified macroscopically, even by a geologist. Thinking back on assemblages I worked with when I first moved to this area from the chert-rich Midwest, I know there are several lithic material types that I was convinced were chert but now know to be fine-grained volcanics. I don't think I'm alone in having made this mistake, either, and since the ratio of "exotic" chert to "local" volcanics has often been used as an index of trade in this region, it is quite possible that there are a great many erroneous values in the literature.

Even if we can identify the kind of rock we are dealing with, we are still faced with sourcing rock types that have not received a great deal of study by archaeologists. While the literature on sourcing obsidian and chert is extensive (Luedtke 1992), far less research has been done on rhyolites, argillites, quartzites, and quartz. We don't really know how much they vary in their geochemical or petrographic properties, and this makes it difficult to apply the more objective sourcing methods.

Volcanics and argillites certainly weather more quickly and thoroughly than cherts, probably because of their coarser textures and different mineralogy. I have seen flakes, eroding from sites on the Boston Harbor Islands, that could not have been exposed to the air and sun for more than a year, yet which were already noticeably bleached on their upper surfaces. All of us have seen New England artifacts weathered so thoroughly that the flake scars are virtually indistinguishable. And all of us have our favorite examples of artifacts found in two pieces that fit together perfectly, even though they look like they are made of two different materials. Presumably, small variations in soil type and moisture caused a single raw material to weather quite differently in different areas of the site. Weathering is significant because it can drastically alter macroscopic properties, and often microscopic and chemical properties as well (Calogero 1991), thus making source identifications even more difficult. Furthermore, most of our colleagues are understandably reluctant to let us break their precious artifacts we so we can examine the unweathered interiors!

Yet one more problem for New England archaeologists is the fact that we live in a part of the world that was glaciated, and glaciers can carry large rocks a great deal further than rivers can. Volcanic materials often travel especially well because they form in massive deposits to begin with and are tough rocks that don't break up easily. Glaciation thus increases the number of sources we must control before we can start drawing conclusions about prehistoric trade. Those of us working in the New England coastal zone are especially aware that prehistoric people often obtained their raw materials from secondary sources rather than from bedrock quarries. The presence of distinctive weathering rinds on decortication flakes makes it abundantly clear that the occupants of many of our sites were getting raw materials right off the beaches, where large cobbles of usable material have been winnowed out of the glacial deposits by wave action. Even if the original bedrock source of these rocks lie far to the north, they cannot be considered non-local materials archaeologically.

None of the problems I've discussed so far are new to most of us (see for example Dincauze 1976) and none are impossible to overcome, but all must be acknowledged and taken seriously if we want to improve the quality of lithic source data in New England. I have four specific recommendations.

1) We must all make more of an effort to get information about New England lithic sources into the literature. It is my perception that there is a great deal of information on lithic sources in people's heads and not enough on

paper. We should all be submitting more short reports on lithic sources to our various regional journals. Furthermore, the number of amateur and professional archaeologists interested in, and knowledgeable about, lithic sources in New England is surely limited. It would not be an overwhelming task for someone to contact each of them, ask them to describe the sources they know about, pinpoint the locations on maps, and then field check each source. This would be a nice, straightforward project which would make a lasting contribution to New England archaeology.

2) We must determine how far each raw material type is distributed in secondary deposits such as river and stream beds, and especially in glacial deposits. Some of this information may be available in the geological literature, but I suspect we'll have to collect much of it for ourselves. We probably will also find that some material distributions do not form nice neat ovals on the maps, but rather have disjunct distributions. For example, my admittedly cursory investigations indicate that the beach cobbles on Nantucket, which have eroded out of terminal moraine, appear to include rock types from all over New England. In contrast, a beach I examined recently near Plymouth seems to be dominated by local rock types.

3) We must make more use of petrographic and geochemical methods of sourcing, and not rely entirely on eyeball analysis. This does not mean that identifications based on visible properties are entirely useless; as stated above, they can provide reliable information under some circumstances and are probably the only way to process large assemblages. Nevertheless, we must use other methods to check and/or validate our eyeball identifications, especially in the case of rare or "exotic" materials. For example, we must stop identifying all green volcanic materials as Kineo felsite until we can be certain there are not similar-looking materials at other New England sources, and until we can be certain of the geochemical and petrographic properties of Kineo felsite. Furthermore, all of us doing lithic sourcing need to have the courage to do blind tests, no matter what analytical method we use. These are very simple to do; the first step is to have someone else pick a series of quarry samples (not artifacts) that you have never seen before. You then perform your preferred method of analysis, make your identifications, and check back with the person who selected the samples to see what percent you got right. Assuming you have a high success rate, you should include this figure in your publications to justify your expertise and provide some objective reason for others to accept your identifications. If there are errors, they will help you to refine and improve your methods, whether macroscopic, petrographic, or geochemical.

4) Finally, we need to increase communication among those of us interested in source analysis. The recent symposium on Lithic Material Identification organized by Duncan Ritchie and Barbara Calogero for the 1992 Annual Conference of the Northeastern Anthropological Association was an excellent start. We also need to exchange samples with one another and try different types of analysis on the same samples. There is probably no single method of analysis that will work in all situations, and we need to build up an arsenal of analytical methods so we will have a variety to choose from to solve our various archaeological problems.

Perhaps more than in most other disciplines, we archaeologists rely very heavily on the accuracy of each others' judgements. We routinely compare the findings from our sites with those reported from other sites in the region, and we compile data from other peoples' site reports to draw broader conclusions about human behavior in the past. We assume that the data in these site reports are accurate because we usually cannot "replicate the experiment" by re-excavating the site or re-doing the analysis. In the case of lithic source identifications, some of our trust may be misplaced. At the very least, some of the especially influential and frequently cited source identifications in the literature need to be checked by other methods, to make sure we are not allowing ourselves to be led further and further astray by initial misidentifications. In the future, a greater willingness to confront and overcome the various obstacles facing those who would do lithic sourcing in New England should ensure that the source identifications appearing in the literature will be both accurate and verifiable, and that the conclusions we draw from these data will actually be relevant to the human behavior we are trying to understand and explain.

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A BRIEF NOTE TO CONTRIBUTORS

The Editor solicits for publication original contributions related to the archaeology of Massachusetts. Manuscripts should be sent to the Editor for evaluation and comment. Authors are requested to follow the style guide for *__American Antiquity__* *57:749-770 (1992; on file at Robbins Museum). Radiocarbon ages should be reported as radiocarbon years* $\pm$ *sigma B.P., not A.D. or B.C. unless calibrated. Please state whether* $\delta^{13}C$*-corrected (give* $\delta^{13}C$*) or uncorrected and what material was assayed. Authors with MAC and IBM-PC compatibles are encouraged to send disks with files in WordPerfect 5.1 or ASCII to the editor. High density disks are preferred; disks can be returned. For additional instructions for authors see* *__Bulletin of the Massachusetts Archaeological Society,__* *Volume 50, Number 2:76 (1989).*

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RECENT RESEARCH AT THE G. B. CRANE SITE NORTON, MASSACHUSETTS

Robert G. Goodby

INTRODUCTION

Excavations at the G.B. Crane site in Norton, Massachusetts (19-BR-214) by students from Wheaton College, under the direction of the author, have contributed to the professional investigation of this site that began in 1979. The research described below has resulted in the discovery, excavation, and analysis of a small habitation site radiocarbon dated to the Late Woodland period, as well as the recovery of artifacts that document the continued use of this site over a long expanse of prehistory beginning in the Early Archaic period.

SITE LOCATION AND ENVIRONMENTAL SETTING

The G.B. Crane is located in the town of Norton, Massachusetts, on the Three Mile River, a tributary of the Taunton River, which empties into Narragansett Bay some 17 miles (27 km) to the south of the site (Figure 1). The site area appears on the USGS Norton Quadrangle. The site ranges from 60 to 75 feet (18-22 m) above sea level, and rises some 10-15 feet (3-5 m) above the Three Mile River (Figure 2). The northern half of the site, with the exception of a fringe of woodland along the river, is under cultivation by a local nursery company. This activity includes plowing and tilling, as well as the use of mechanized tree-removal equipment that results in columns of soil being removed to a depth of 1.5 meters. While this area of the site has long been under cultivation, the recent nursery activity is having a particularly destructive effect on archaeological deposits.

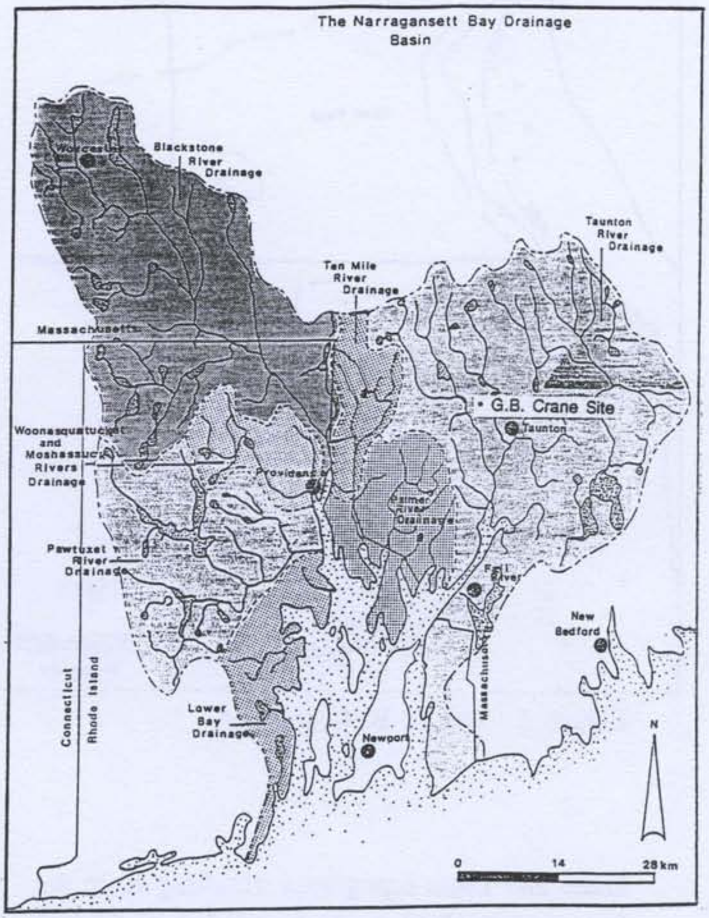

Figure 1. Taunton River Drainage.

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To the south of the cultivated field there is an area of secondary growth forest, dominated by oak, hemlock, and white pine. The immediate environment is a mosaic of wetlands, forest, small ponds and lakes, streams and small rivers. In ecological terms, this area is comprised of a patchwork of microenvironments formed by a

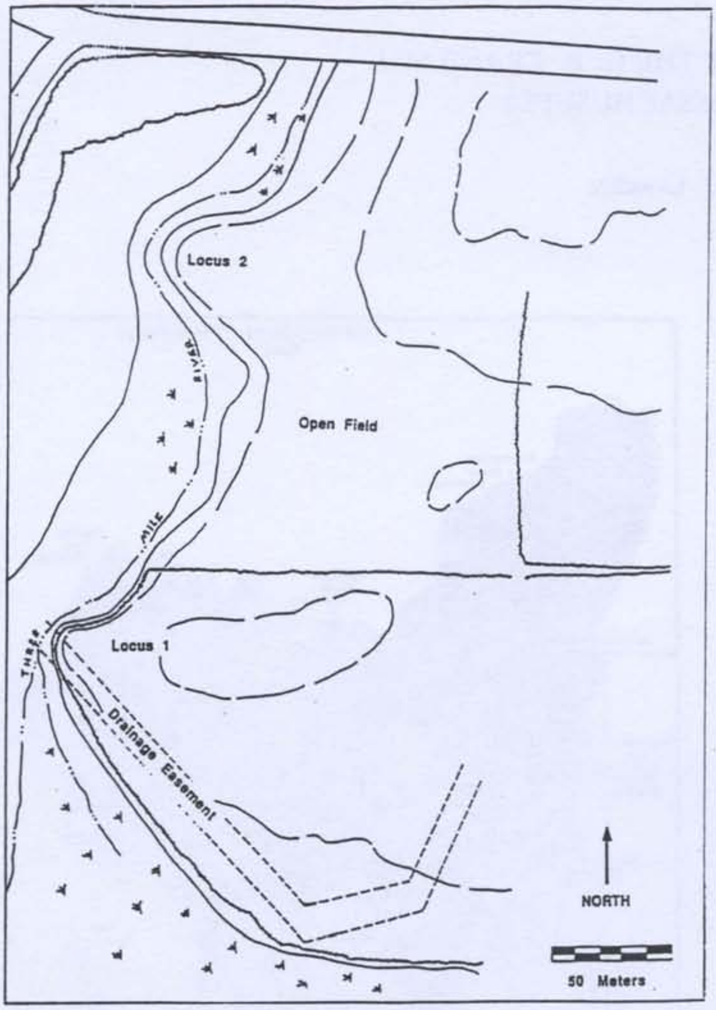

Figure 2. The G. B. Crane Site.

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kame and kettle topography resulting from the last glacial episode, which ended some 13,000 years before present. Soils at the site are composed largely of wind-borne (eolian) materials dating to the end of this glacial period (Leveillee 1981:3-5). A distinct plowzone has been noted for almost all areas of the site.

PROJECT HISTORY

The Wheaton College investigation at the G.B. Crane site began in the fall of 1989, and was designed to provide an introductory field experience to anthropology students at the college. The site was selected for a number of reasons, including its proximity to the college, the detailed information available on the site from prior investigation by the Public Archaeology Laboratory, Inc. (PAL, Inc.), and its potential for making a contribution to the study of regional prehistory. The Wheaton College investigations consisted of shovel-test transects, surface collections and the excavation of 21 one meter square excavation units in two separate loci.

Professional investigation of the site by PAL, Inc. took place between 1979 and 1983, and included an intensive survey, a site examination, and a data recovery program undertaken in association with the construction of a wastewater treatment facility (Leveillee and Goldsmith 1979; Leveillee 1981; Thorbahn, Cox, and Ritchie 1983). These investigations revealed the presence of a multi-component prehistoric site, with prehistoric cultural material concentrated towards the edge of the Three Mile River.

Cultural material recovered from the site by PAL, Inc., included Middle Archaic projectile points, quartz and argillite Small Stem and Squibnocket Triangle projectile points, and a number of features radiocarbon dated to the Late Archaic period. Following the Late Archaic occupation, there appeared to have been a hiatus in the site's occupational sequence. A single chert Susquehanna projectile point suggested an ephemeral visit by Terminal Archaic peoples. The next significant prehistoric occupation of the site appeared to have been during the Middle and Late Woodland periods. These occupations are represented by a cache of Fox Creek points, a Jack's Reef point, sand and shell tempered ceramic sherds, a hornfels lithic workshop, and a number of features, one of which returned a radiocarbon date of 850 $\pm$ 205 B.P. (Thorbahn, Cox, and Ritchie 1983:73).

SHOVEL TEST TRANSECTS

As part of the Wheaton College investigation at the G.B. Crane site, a series of shovel-test transects were excavated. Thirty-four shovel test pits, each 50 cm^2, were excavated by natural soil horizon, with horizons sub-divided into artificial 10 cm levels. All soil was screened through 1/4 inch (0.6 cm) hardware cloth, and test units were excavated to at least 50 cm in depth. Soil color and texture were noted for each natural soil layer. These shovel test transects were utilized to identify loci threatened by erosion or other destructive processes. While few test pits produced significant quantities of cultural material, a quartz small stem point and the basal portion of an Early Archaic bifurcate base point were recovered from test pits near the river's edge. A complete description of shovel testing is available in the original site report (Goodby 1991).

SURFACE COLLECTIONS

As noted above, portions of the site area are in active use by a local nursery company, so that a broad area of exposed, disturbed soils exists. These open areas, some 4 acres in extent, were subjected to a systematic walkover. The results of the walkover suggested that prehistoric occupations were concentrated within 100 meters of the Three Mile River. This is roughly consistent with the results of testing performed by PAL, Inc. Surface-collected artifacts comprised the large majority of diagnostic artifacts (Figure 3) recovered during the Wheaton College investigation, and provide a chronology for the site's occupation.

Surface finds include conjoining fragments of a ground-slate ulu (Fig. 3), assignable to either the Middle or Late Archaic periods (Snow 1980: 184). The Late Archaic period was represented by at least two Brewerton-notched points, indicating a previously unrecognized Laurentian tradition occupation (Fig. 3). A number of Small-Stem and Squibnocket triangle points were recovered (Fig. 3), most in an area identified as a Late Archaic locus by PAL, Inc. It was noted that the Laurentian and Small Stem artifacts were not found in association, but were some 30 meters distant from each other.

Testing and excavation by PAL had revealed only a single diagnostic point from the Terminal Archaic period, suggesting a hiatus in the site's occupational sequence between the Late Archaic and Middle Woodland periods. However, during the walkover survey, a number of projectile points from this period were recovered, including Orient, Mansion Inn, and Atlantic point types (Dincauze 1968; 1972). No artifacts clearly diagnostic of the Early Woodland period were recovered. The Middle Woodland period was represented in the surface finds by a single Fox Creek-like point made of dark grey felsite; a non-diagnostic hornfels biface and hornfels chipping debris also likely date to the Middle Woodland period.

LOCUS 2: A LATE WOODLAND HABITATION

As a main goal of the Wheaton College excavations was to provide students with training in archaeological fieldwork, a single portion of the site (locus 2, Fig. 2) was selected for intensive excavation. This area consisted of a small peninsula bordered by the Three Mile River to the west, a steep ravine to the south, and wetlands to the north.

Excavations in this area commenced at the end of November 1989. Contiguous one-meter square excavation units were laid out in reference to the original PAL, Inc. datum point

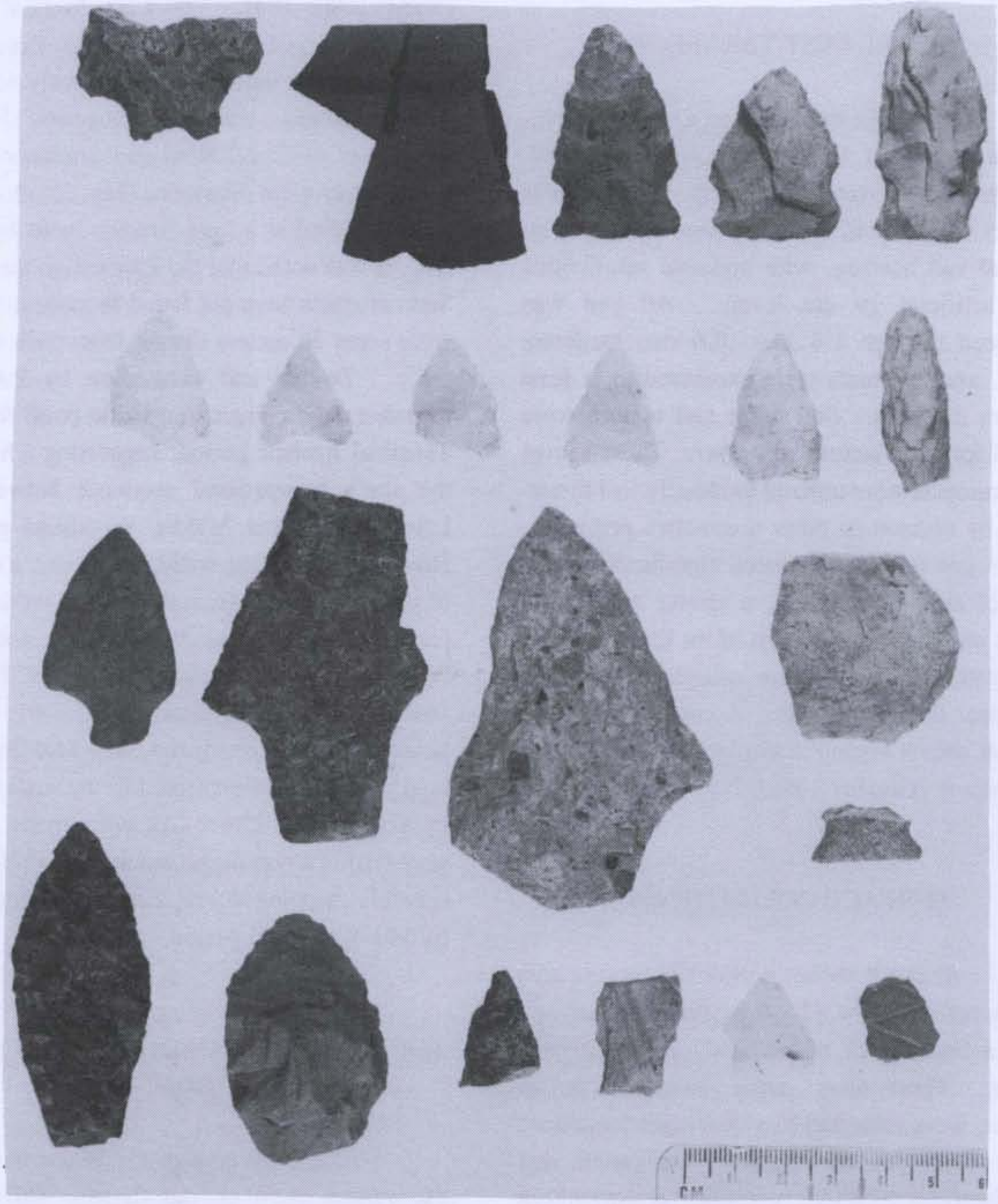

Figure 3. Prehistoric artifacts from the G.B. Crane site. Top row: Bifurcate Base point, ulu, Brewerton notched points; 2nd row: Small Stem tradition bifaces; 3rd row: Susquehanna tradition bifaces and biface fragments; 4th row: Fox Creek biface; hornfels preform; biface fragments from Locus 2; incised ceramic sherd from Feature 6.

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(Leveillee 1981:22). Units were excavated individually, and were backfilled upon completion. Soil was removed by skimming with a flat-bladed shovel and by troweling. Excavation proceeded by natural soil horizon, with horizons sub-divided into artificial 10 cm levels. All soil was screened through 1/4" (0.6 cm) hardware cloth. Each unit had its own sub-datum point,

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located in the corner of highest elevation. All vertical measurements were taken with a line level and metric tape measure from these sub-datum points. Excavation proceeded in each unit until sterile sub-soil was reached. Plan views were sketched and photographed when necessary, primarily in association with features. Following the completion of each unit, soil profiles were recorded and photographed. All soil textures and colors were recorded.

Overall, the number of artifacts and intact features at this locus was low. However, the distribution of these artifacts and their relationship to features provides (Figure 4) an interesting glimpse of the spatial structure of what seems to have been an ephemeral occupation by a small number of people at approximately 1000 years before present. Two small, discrete concentrations of lithic debris were noted, one of Attleboro Red Felsite, and the other of a fine-grained grey volcanic material, probably originating from sources in the Boston Basin area. Both concentrations abutted a hearth feature (Feature 6). No diagnostic tools of either material were recovered. The reduction of Attleboro Red felsite resulted in both large secondary flakes and tertiary flakes, suggesting reduction was proceeding from quarry blanks transported to the site from nearby outcrops in and around the modern town of Attleboro (Strauss and Murray 1988). The concentration of grey volcanic debitage consisted of small flakes, suggesting reduction from preforms. Flakes of both materials were found in the area of oxidized soil and fire-cracked rock associated with Feature 6, and appeared to have

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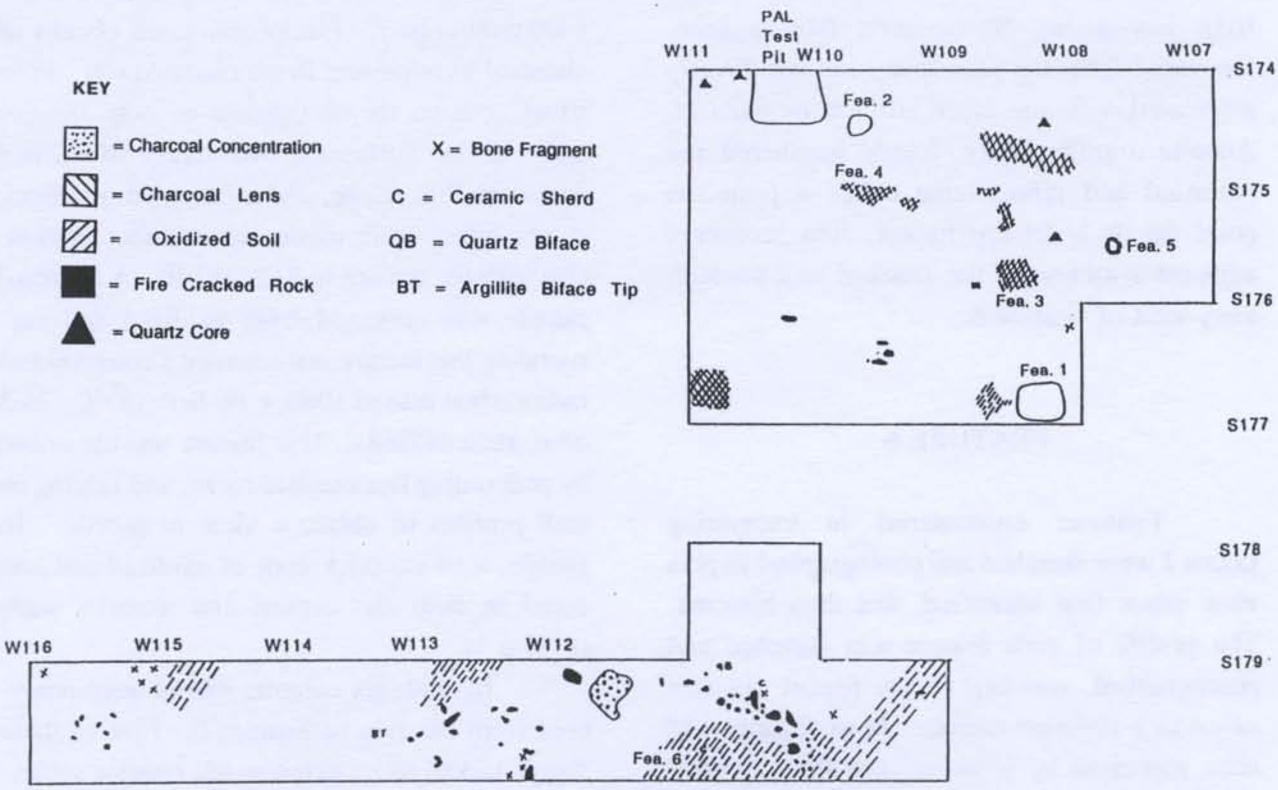

Figure 4. Locus 2.

been burned by the associated fire. In addition, four grey chert flakes and a single flake of yellow jasper were recovered from this locus.

While very little quartz chipping debris was found, four quartz cores were recovered from the northern portion of the locus. Three of these were recovered from the subsoil significantly below the interface, notably deeper than other cultural material. These cores may represent an earlier occupation, or the storage of these cores by the Late Woodland occupants of the site. Their association with the Late Woodland occupation is supported by the recovery of a quartz biface fragment and a few quartz flakes from Feature 6. A reliance on locally available lithic materials, such as quartz and Attleboro red felsite, is characteristic of Late Woodland sites throughout southeastern New England (Ritchie 1985; Goodby 1991:51).

Two non-diagnostic bifaces (Fig. 3 bottom row) were recovered from this area. One was a crude stemmed biface manufactured from low-quality Narragansett Bay argillite, recovered from the plowzone, and not directly associated with any other artifacts or features. Another argillite biface, highly weathered and patinated and representing either a projectile point tip or a drill/perforator, was recovered adjacent to an area of fire-cracked rock immediately west of Feature 6.

FEATURE 6

Features encountered in excavating Locus 2 were sketched and photographed in plan view when first identified, and then bisected. The profile of each feature was sketched and photographed, and half of the feature fill was saved as a flotation sample. Most features had been truncated by plowing, and their original locations were apparent from thin lenses of charcoal and oxidized soil still intact in the top of the subsoil. Not all of the six features recorded and excavated in this area can be positively attributed to prehistoric inhabitants. A complete discussion of each feature is presented in the original report; this report will focus on the most significant feature, Feature 6.

Feature 6 was first identified in test pit S179 W110, when fire-cracked rock and an incised ceramic sherd (Fig. 3, bottom row) were recovered from the subsoil. Subsequently, an entire meter square excavation unit was opened around this test pit. While Feature 6 as defined during the excavation is limited to this excavation unit, it appears to be part of an activity area that stretches along the southern edge of the peninsula.

This feature appeared at the top of the subsoil in EU S179 W110 as a roughly curved line of tightly packed fire-cracked rock extending from the southeast to the northwest (Figure 4). Oxidized soil extended across the southern half of the unit, but was most pronounced in the southwest corner. Flecks and small chunks of charcoal were present in the oxidized soil. Four small ceramic sherds (spalled on both interior and exterior surfaces), two flakes of burned Attleboro Red felsite, and a fragment of a thick quartz biface were recovered in direct association with the feature in S179 W110. A charcoal sample was collected from oxidized soil surrounding this feature and returned a conventional radiocarbon date of 1060 $\pm$ 60 B.P. (δ^{13}C:-25.3 o/oo; Beta #45968). This feature was excavated by pedestaling fire-cracked rocks, and relying on wall profiles to obtain a view in profile. In profile, a 10 cm thick zone of oxidized soil was noted in both the eastern and western walls (Figure 5).

In total, six ceramic sherds were recovered from the area of Feature 6. Five of these sherds lacked intact exterior and interior surfaces; the sixth consisted of a body sherd decorated with incising on the exterior surface. The

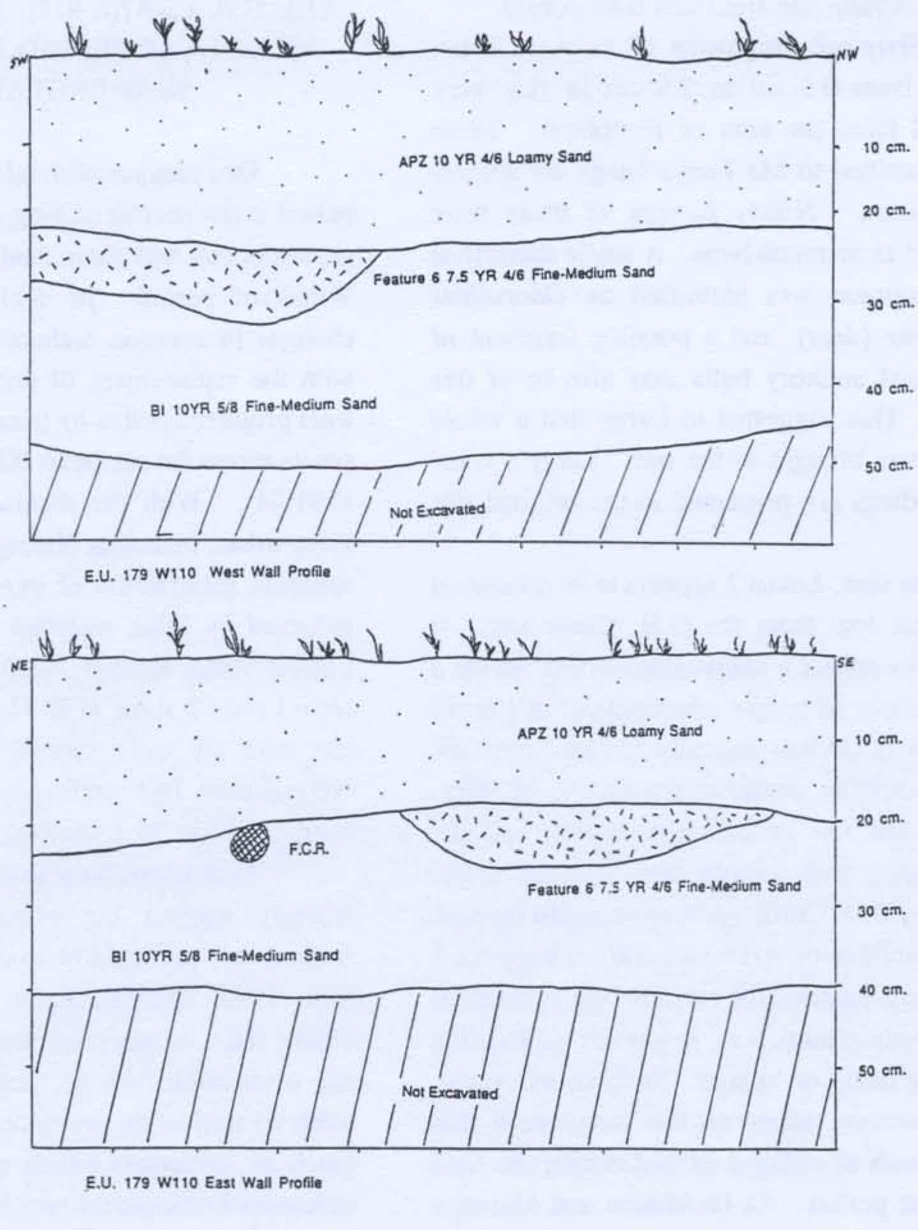

Figure 5. Feature 6 profiles.

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sherds from feature 6 are thought to represent a single vessel lot. This vessel was characterized by a smoothed exterior surface incised with a pointed, stylus-like tool with a tip approximately 1 mm in width. This vessel represents an unusually early example of incised decoration from the Narragansett Bay drainage (Goodby 1992). The vessel was tempered with poorly sorted, rounded fragments of crushed feldspar, most of which were between 0.10 and 0.30 cm in size. The exterior surface was pale brown (10 YR 6/3) in color, suggesting an oxygen-rich atmosphere during firing (Shepard 1976:217--220). There was no indication of coil fractures, and vessel size and morphology could not be determined. In general, these sherds are consistent with other grit-tempered sherds recovered from Middle and Late Woodland loci by PAL, Inc. suggesting the existence of multiple loci at the G.B. Crane site from this time period.

Sixty-one fragments of calcined bone, ranging from 0.5 cm to 2.0 cm in size were collected from the area of Feature 6. These were submitted to Ms Tonya Largy for species identification. Ninety percent of these were identified as mammal bone. A single metatarsal shaft fragment was identified as *Odocoileus virginianus* (deer), and a possible fragment of the internal auditory bulla may also be of this species. This suggested to Largy that a whole carcass was brought to the site. Largy's complete findings are presented in the original site report.

In sum, Locus 2 appears to be consistent with other loci from the G.B. Crane site. It appears to reflect a short-term occupation by a small number of people who engaged in a limited range of archaeologically visible activities. These activities included processing of deer, possibly the use of ceramic vessels, and the maintenance and manufacture of stone tools. While the G.B. Crane site was occupied through most of prehistory, existing evidence suggests it was never a location for extended occupations of multi-family groups, i.e., it was not the location of a base camp or village. Such an interpretation, however, relies on the assumption that entities such as villages existed during the Late Woodland period. As Handsman and Maymon (1987) have suggested, settlement may have exhibited considerable diversity, and during the Late Woodland period small "hamlet" size settlements, composed of a single or a few family units, may have been important. By working with the assumption that residence sites will be large and artifact-rich, and will be surrounded by smaller sites that are used for particular economic activities, archaeologists run the risk of making invisible those forms of settlement which are not accounted for by such models (Handsman and Maymon 1987).

THE G.B. CRANE SITE AND THE LATE WOODLAND PERIOD IN SOUTHERN NEW ENGLAND

One characteristic of the Late Woodland period is the decline of long-distance interaction networks that had flourished during the Middle Woodland period. Its decline coincided with changes in ceramic technology and style, and with the replacement of corner-notched Jack's Reef projectile points by triangular Levanna-like points across the northeast (Goodby 1988; Fiedel 1991:24). With the demise of this network, many areas, including Narragansett Bay, saw an apparent localization of interaction, at least as reflected by lithic material usage (Kerber and Larson 1989; Ritchie 1985). Lithic materials from Locus 2 at the G.B. Crane site are consistent with the trend toward localization in the Narragansett Bay drainage, as they are from sources within 30 miles (48 km) of the site.

In southern New England, recent studies strongly suggest the existence of sedentary settlements, particularly in coastal areas (Bernstein 1990; McMannamon ed. 1986; Ritchie 1969). This is based on seasonal indicators of site occupation such as quahog shell and deer teeth, as well as the presence of ceremonial sites (such as ossuaries) which are associated with sedentary horticultural populations elsewhere in eastern North America (Trigger 1969). This sedentarism is accompanied by a reliance on locally available food resources, such as deer, fish, and shellfish (Kerber 1984; Kerber and Larson 1989; Bernstein 1990; Hoffman 1989). While Locus 2 at G.B. Crane appears to be a short-term campsite, such sites are not incompatible with sedentary settlement patterns. Small camps may reflect specialized economic activities such as deer hunting, or they may result from travel between hamlets or villages. In general, Late Woodland settlement patterns are well-documented for coastal areas, but are less well known in interior locations (Bernstein 1990).

CONCLUSION

The Wheaton College excavations have contributed to archaeologists' understanding of the G.B. Crane site. Together with the results of the PAL investigations, the available data demonstrate the repeated occupation of this site over a long period, beginning as early as 9000 B.P. and continuing until the Late Woodland period. The only potential hiatus in the site's occupation is during the Early Woodland period, although even this period may be represented by "Small Stem" tradition artifacts. The Late Woodland occupation of the site conforms to a number of patterns that are beginning to emerge from the archaeological record for southeastern New England, including an increasing localization of interaction as reflected in lithic utilization and ceramic style and technology. In general, the long-term consistency in the use of the G.B. Crane site as a location for short-term occupations and/or specialized activities is notable, and when combined with information from larger "habitation" or "base camp" sites in the Taunton River drainage should provide information about a range of questions dealing with local prehistory.

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EARLY WOODLAND DEPOPULATION: A REVIEW OF THE LITERATURE

Mary T. Concannon

"The simplest and yet most powerful explanation for the scarcity of Early Woodland base camps is that they should be rare" (R. Barry Lewis).

ABSTRACT: In order to assess the question of Early Woodland population decline, this paper will focus on several criteria, including site size and frequency, artifact assemblages, and burial complexes. These criteria, combined with reassessment of radiocarbon dates, will then be used to show that a continuity exists between the Late Archaic and Early Woodland periods that has often gone unrecognized in the current literature. A re-examination of available data will show that current inferences of demographic decline are no longer valid, and that Early Woodland demographics may rival those of the preceding Archaic period.

INTRODUCTION

After the florescence of the Late Archaic Period, the Early Woodland (2700-1600 BP)/(700 BC-350 AD) has been viewed as a period of general decline, a time of few innovations, limited diagnostics (pottery and blocked-end tubular pipes being the major exceptions), and low site visibility. This has led many archaeologists to the conclusion that the Early Woodland has little to offer, and that the lack of evidence--either sites or artifacts--reflects a demographic decline during this period. Thus, this period has become an "orphan", and archaeologists have turned to other times and other sites as they rebuild a picture of prehistoric lifeways.

How justified is this? Does a lack of evidence signify a decrease in population, or is something else going on? Can looking at the picture in other ways yield another set of "answers" or possibilities? By evaluating criteria such as radiocarbon dates, artifact assemblages, burial complexes, and site size and frequency, it is possible to determine if factors reflecting depopulation are present. These factors include a lack of or a decline in resources, severe climatic changes, and the evidence of disease in populations. Implicit in this discussion will be the assumption that migration in the Terminal Archaic was limited, and that the Susquehanna, Adena, and related "new" traditions were predominately a trade-based phenomena. After an examination of the above, we will argue that continuity characterizes the Early Woodland.

RADIOCARBON DATING

One way of "ordering" the past is to assign temporal boundaries to establish chronology and distinguish between periods. It is assumed that this method will allow clear-cut differences between units of time and their attendant diagnostics to be recognized and evaluated, and will allow for patterning in the archaeological record. Moreover, understanding the dynamic cultural processes that are at play over time requires that chronological sequences be worked out.

Radiocarbon dating allows for just this

kind of evaluation. Elena Filios (1989) looks at this clustering of radiocarbon dates during the third millennium (3000-2000 BP) as one clue to broadening the view of prehistory. Her examination of horizon markers and radiocarbon assays suggests that the archaeological record of this period is more variable than previously considered.

The Late Archaic and the Early Woodland periods have a number of meanings. Filios sees the distance between them as being conceived of in taxonomic terms rather than as a result of natural or social processes (Filios 1989:78). Moreover, she proposes that horizon markers between the periods are poorly known, and her analysis does much to bear this out.

Although she finds that there are two brief periods of the Early Woodland characterized by low numbers of uncalibrated "mean ages," she feels that these dates (2700-2400BP) have been distorted by lack of use of standard deviation (1989:82). By applying methods of calibration Filios contends that peaks in the distribution of mean ages are caused not by cultural factors, but by wiggles in the calibration curve. Also, while there are spatial and temporal gaps in the record (specifically, a drop in the number of radiocarbon dates during the third millennium), this can result from the behavior of archaeologists (biases in recording dates and dismissing some dates as "wrong") combined with the perceived need to establish "firm" dates for traditions, as well as differential preservation. Indeed, Filios stresses that "Gaps in the radiocarbon record do not represent gaps in the cultural record of the region" (1989:87).

She also points out that "the archaeological record cannot be sorted into mutually exclusive categories using traditional horizon markers" (1989:87), and questions assumptions regarding the chronological position of archaeological material associated with the third millennium. Filios finds that a number of traditional Early Woodland horizon markers appear in association with horizon markers which characterize the Late Archaic (for example, the association of Vinette I pottery with Susquehanna points, and small-stemmed points). Therefore, some horizon markers do not indicate exclusive temporal units. Filios sums it up as follows: "explanations that focus on sample bias...need to be thoroughly evaluated before we can conclude that the radiocarbon evidence reflects a population decline or any other cultural process" (1989:91).

ARTIFACT ASSEMBLAGES AND ASSOCIATIONS

If we agree that some traditional horizon markers are not well-defined in time or space, then we can move beyond the simplistic assumption that "Diagnostic artifacts of a period have crisp temporal cutpoints at the period's beginning and end, are homogeneously distributed across the unit of space encompassed by the period, are equally as common during its entire duration, and are at least potentially recoverable at each site" (Lewis 1986:596). As Snow points out, "identifying components on the basis of diagnostic point types and going on to inferences having to do with phases and prehistorical populations may be a satisfying but nonetheless misleading archaeological exercise" (1980:254).

In fact, it has long been hinted that there is continuity between Late Archaic and Early Woodland sites. As early as 1964, Griffin saw an extension of Late Archaic (burial) complexes into the Early Woodland, and held that there was "extraordinary cultural growth, population increase, and evidence of exchange of goods ...in the Northeast between

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3000 and 2000 years ago" (1964:235). Moreover, since small-stemmed points extend into the Early Woodland, they are not specifically diagnostic to the Late Archaic. This common typological confusion has led to assumptions that the Early Woodland is a time of few artifacts, an assumption that, under present circumstances, needs to be reviewed.

In addition, there is the question of time-lag. Dragoo, for example, holds that there is no distinct division between Archaic and Early Woodland periods; that the major traits used to separate the two periods appear at different times in different regions, and are derived from similar sources (1975:22; 1976:6). Thus, sites in close spatial and temporal proximity may not reflect the same assemblages while sites separated temporally may exhibit parallel assemblages. For example, at the Boucher site, Heckenberger et al. perceive a blend of Meadowood, Glacial Kame, Middlesex, and Adena complexes that are virtually indistinguishable from one another, and which share certain attributes over a large geographic area (1990:109).

BURIAL COMPLEXES

Burial complexes are one site-type that allows for determining boundaries, or the lack of them, between periods and cultures. Indeed, because they represent a single event, they allow the archaeologist to assess the foundation upon which continuity (and in some instances, trade networks) was established.

Dragoo (1976:6) sees the Red Ocher /Red Paint, Glacial Kame and other burial complexes present between 2000 and 1000 BC as Late Archaic manifestations which lay the groundwork upon which the Early and Middle Woodland periods were built. The burial ceremonialism of both Adena and Early Woodland groups was thus essentially an elaboration of earlier Archaic practices. The spread of Adena manifestations was dependent upon both increased population and a more complex social organization.

The link between Glacial Kame and Early Woodland assemblages is also found in the Boucher Site in Vermont, which is dated circa 1000-100 BC (Heckenberger et al. 1990: 138). Indeed, evidence from that site not only suggests that complexes which include Middlesex (traditionally associated with the Early Woodland), Meadowood, Adena and Glacial Kame are indistinguishable from one another, but suggests, too, that "Early Woodland mortuary ceremonialism [can be] best interpreted as an outgrowth of earlier mortuary expressions, and that no clear boundaries can be applied to the Middlesex either temporally or geographically" (1990:109). Preservation at the site resulted from the extensive presence of copper (6,732 pieces were recovered) and the proximity of skeletons to these artifacts.

The evidence from Boucher fits well with concepts expressed by Filios (1989). For example, the question of horizon markers is important here, as the authors attempt to evaluate this site and its artifact assemblages in relation to other burial complexes in the same geographical area. Comparison yields interesting but, at this juncture, hardly surprising results. Throughout the region, a large number of transitional Late Archaic artifact types are found in Early Woodland contexts. This is clearly evident in the Isle La Motte site (traditionally associated with Terminal Archaic Glacial Kame), which the authors perceive to be an early expression of ceremonial behavior typically associated with later groups (Heckenberger et al. 1990:138). Moreover, they stress that often two artifact complexes overlap, citing radiocarbon dates for transitional Orient points which fall between the 1000-700 BC range (evidencing a relationship with Middlesex which they believe needs scrutiny), as well as the persistence of such Late Archaic diagnostics as steatite bowls within Early Woodland horizons (1990:138).

The Boucher site offers an additional bonus--a glimpse of the richness of life in the Early Woodland that is rarely preserved in the Northeast, including textiles and other fiber artifacts that add a dimension not usually seen in the archaeological record. Burial features contained bark, presumably used as either wrapping or containers, and at least one individual was interred in a textile bag or other type of wrapping (Heckenberger et al. 1990: 114). Indeed, the number of textiles found on the sight is impressive: ninety-nine textile fragments were recovered, and a total of 23 woven objects has been identified (1990:128). Closely-woven fabric from feature 107 has been interpreted as either a shroud or a cowl (1990: 128). Decorated bags containing beads in the process of being worked were also recovered.

Fiber cordage made from plants such as milkweed (Asclepias syriacca) and basswood (Tilia americana) is also included in the assemblage and shares with recovered textiles a distinctive S-weft manufacture (Heckenberger et al. 1990:127-128). In all, the weaving, patterning, and decorative styles lend a feeling of artistry to the Boucher assemblage.

Along with textiles and fiber remains, the presence of hide artifacts widens the dimensions at Boucher. Hide thongs are found in thirty-two features, and dressed hide artifacts in twenty (Heckenberger et al. 1990:30). The latter consists of two hide garments and three hide bags, distinctive not only for their preservation, but also because of the clues they might yield to social processes. For example, both hide garments were found with children, and each burial included copper beads and fabric wrapping, yet no tools were recovered. Heckenberger and his associates find that artifact inclusion is related to age, and that subadults and pre-pubescents were treated differently in burial from adults (1990:130).

The hide bags, too, may provide additional insights to social processes, particularly as they apply to seeming differences in use. While one bag simply contains copper beads, a second bag has been coated with a red ochre veneer. It is the third bag, however, that is the most interesting. Found accompanying the burial of a middle-aged man, its contents include the remains of snakes, mink, fox, raccoon, duck, and an unidentified cervid, and has been loosely termed a "medicine bag" in the literature (Heckenberger et al, 1990:130). The preservation of bone artifacts, usually "lost" in the acidic New England soil, makes clear their importance in the Early Woodland tool kit, and reinforces the role differential preservation plays in our attempts to recreate past lifeways. At Boucher, faunal remains have been assigned to nine categories of tools, including awls, cutting tools, needles, celts, and fishhooks, and are derived from mammals including deer, beaver, bear, as well as turkey, bird and fish. These artifacts are most frequently associated with cremations.

In addition to the lithic and copper tools present at the site, the utilization of such a wide range of faunal and vegetal material in such varied ways does much to show that this population had a rich subsistence base which it was able to exploit to great advantage. This hunting and foraging strategy is one Loring sees as continuing Late Archaic trends into the Early Woodland in Vermont (1985:103). Moreover, he holds that procurement of foods meeting the basic needs of the group on a day-to-day basis reflects a non-stratified, egalitarian society (1985:103), a finding borne out by the Heckenberger team, which found that mortuary variability is linked more with distinctions related to age, gender, and personal achievement as opposed to ranking or status with in a society (1990:137). Until the Boucher site can be shown to be an anomaly, the speculation that a lack of or decline in resources characterizes the Early Woodland should be re-evaluated, as it is clear that basic needs there were well met.

Skeletal remains from both the Boucher and the Tufano site in New York indicate that the aboriginal populations were in good health. Ritchie (1976, cited in Snow 1980:270) makes specific note of the good condition of dentition. This evidence would suggest that one population pressure--disease--was not a factor for these groups. Thus, one more important element for possible population decline is clearly eliminated.

SITES: SIZES, FREQUENCIES, AND DENSITIES

We come now to the crux of the matter --applying the interpretive evidence in ways discussed above to the question of site size, frequency, and density. The lack of Early Woodland sites has long been held to be indicative of population decline; however, as Lewis explains, "given comparable population sizes and technology, sites tend to be abandoned at about the same rate regardless of period (and therefore, that roughly the same number of new sites are created per unit time)" (1986:596). If, indeed, sites are created and abandoned in roughly equal measure, then by breaking down time periods into equal units it will be possible to determine whether a) there is a decline in Early Woodland sites and b) this reflects depopulation.

In 1980, Barber suggested that population change could be assessed by applying various demographic models to different periods of prehistory. While conceding that data for these models is hard to collect archaeologically because temporal control is different for modern versus prehistoric groups, he felt that application was possible if the site inventory were large enough. By combing all available data from every conceivable source (the literature, site reports, field notes, et cetera), he developed a data base of 7875 sites ranging in geographical area from Maine to North Carolina and extending through the range of prehistory. This large number of sites, when broken down into components of separate periods, allowed meaningful statistical analysis (Barber 1980:9); moreover, the data base had the added advantage of representing contiguous areas.

Since time periods under survey were not equal in length (the Late Archaic was 3000 years long, for example, while the Early Woodland was only 1000), Barber next broke the components into numbers per century. Applying standard statistical methods, Barber obtained a result that indicated a more or less steady rise in populations in all states studied (1980:12). Values for the numbers of sites per century were then plotted, and the results for the Late Archaic and Early Woodland were as follows:

Table 1. Number of Late Archaic & Early Woodland components per century.

Period	Duration (yrs)	Components #	# per 100 yrs
Late Archaic	3000	644	21.80
Early Woodland	1000	115	22.52

As is evident from the table above, the number of components per century indicate that Early Woodland sites increased (albeit fractionally) from the Late Archaic. Barber interpreted these results as indicating that environmental resistance had remained constant and the populations had attained a stable size, which they could maintain indefinitely (or until some technological change such as agriculture takes place) (1980:7,13). He thus finds that population stabilization in the Northeast begins in the Late Archaic and extends to the Middle Woodland. He sums up his findings thus "this study has shown no indication of demographic oscillations...In fact, it has shown no population declines whatsoever" (1980:16).

McBride and Dewar applied some of the same basic techniques used by Barber to the Connecticut River Valley. They divided the whole area into components representing time units characterized by their diagnostic artifacts (here, Laurentian, Small-stemmed, Susquehanna/ Orient, Early, Middle, and Late Woodland) (1981:46). By looking at site size (i.e., total area with cultural deposits) and site density (amount of cultural deposits in relation to midden area), they perceive a steady increase in amount of deposits at sites from the Laurentian (Lake Forest Archaic) to the Early Woodland (1981:47). Since density here is indicative of intensity of use, it is therefore a function of the steady rise in population in this region. Thus, while they see trends toward decreasing site frequency, the increase in average occupation area and intensity of use suggests a fairly stable population (1981:48).

McBride and Dewar additionally find that Late Archaic populations moved between different ecozones at a higher rate than did Early Woodland populations (1981:48-50). This finding was also reported by McManamon for sites in the Cape Cod area. He found that Woodland horizons had more midden deposits than did Late Archaic horizons (1984:407). Again, midden frequency has parallels to population presence; were the area depopulated, we could assume that the number of midden deposits would be fewer. McManamon feels that the increased density (the amount of material in relation to midden area) and variety of Woodland middens, are indicative of a move toward more year-round settlement (1984:410). This is a pattern which Ritchie and Funk see for New York, where greater Early Woodland stability is perceived to occur within the context of semi-sedentism (1973:348).

A WORD ON SOUTHEASTERN NEW ENGLAND

There seems to be conflicting evidence for what is going on in this region in the Early Woodland. For example, while Heckenberger and his colleagues find continuity in Adena artifacts in Vermont, Lavin relates the paucity of these artifacts in southeastern New England to stress from a changing environment (1988: 114). She equates the transition toward intensive and extensive exploitation of the coastal areas of New England with a diminishing inland resource supply (1988:108). Dincauze sees climatic change in this region as minor, and a "significant settlement shift" [to the coast] in correlation with "a period of population decline and cultural fragmentation" (1974:50).

Hoffman, in a survey of radiocarbon dates (1985, cited in Lavin 1988:110) shows that low site frequency in the Early Woodland is an archaeological reality, and hypothesizes that this phenomena may be accounted for by either low population or by reliance upon a few habitats, here, estuary heads. Indeed, Dincauze (1973) shows a continuing emphasis on intertidal zones beginning in the Terminal Archaic and extending throughout the Woodland.

One way in which populations adjust to resource fluctuation is to change their distribution; although the parameters are determined by the environment, they are most often reflected

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in cultural change. Jochim sees all environments as having some degree of instability and asserts that hunter-gatherers "incorporate a number of strategies for this instability into their economic and social systems." These strategies include a dependence on alternative resources and settlement location permitting concurrent access to multiple resources. They are accompanied by increased dependence on less mobile, less aggregated resources such as plants, fish, or small game and the utilization of a greater variety of tools (1980:53-54).

New England marshes are one of the most productive landforms in the world, constituting a "breeding ground and food factory for over 250 species of plants and animals" (Lavin 1988:108). Indeed, Vinette-I pottery (an Early Woodland diagnostic) is well-suited for cooking marsh plants and grains. The proliferation of plant material generated by marshes supplies nutrients to tidal areas. Moreover, marshlands are a source of plentiful, reliable, available foods, some of which are exploitable year-round, and they are in close proximity to the southeastern New England coastline. As Lavin states, "the ecologically abundant and reliable marsh habitats could support larger congregations of people for longer time periods, so the result would be fewer sites relative to the Terminal Archaic" (1988:110). This is, in essence, the same type of phenomena McBride and Dewar identified for the Connecticut River area, and fits well with Muller's contention that as populations increased during Archaic times, pressure increased for groups with restricted mobility to develop local resources with less annual variation (in Englbrecht 1980:113).

In Narragansett Bay, Bernstein sees increasing resource diversification towards the utilization of shellfish and a greater variety of plants and animals beginning in the Terminal Archaic (1990:323). One possible explanation for this diversification is demographic pressure, with shellfish exploitation being the first in a series of responses to demographic stress (1990: 344). Yesner (1977, cited in Bernstein 1990: 344) contends, "In a rich, diverse environment such as the shores and hinterlands of Narragansett Bay, expansion of the resource base would be a logical adjustment to conditions of increasing population." Viewed in the context of this rich resource base, the move to a newer subsistence base is not a matter of moving from dark to light; existing technology (such as that used in steatite bowl manufacture) can be easily adapted to marshland use, as in Vinette I pottery, discussed above. In addition, the utilization of marshlands can be viewed as a viable response to dimished inland resources by allowing the kind of access Muller stresses is vital.

Cohen (1975) lists criteria which would indicate that populations were under pressure. Although he feels that ecological factors should be ruled out before these criteria are applied, a number of them correspond to some trends noted by the authors for the region. These include increased reliance on water-based resources (shellfish), evidence of environmental degradation, such as forest burning (which Bernstein notes for the Narragansett area [1990: 343]), diminished inland resources, and regional isolation. The question can be asked if the latter is reflected in the lack of participation for this area in the general Adena trade network, as seen in such period sites as Boucher. Cohen explains that "if these behaviors occur widely enough in time and space, separate from particular events of climate change or other localized variables, then population growth is the explanation" (1975:474). Although more research is needed to assess the environmental impacts on Early Woodland populations in this region, it seems likely that southeastern New England populations were exploiting a viable, varied resource base rather than diminished resources, and that basic nutrient requirements were well met.

CONCLUSIONS AND DISCUSSION

This paper has attempted to shed new light on the Early Woodland, traditionally seen as a period of low population density because of low site frequency and poor diagnostic artifact recovery. A review of recent data, however, reveals that far from being a low-visibility era, the Early Woodland can be characterized as evidencing a continuity from the Late Archaic, and viewed as an era which very much builds upon what has come before. The application of new radiocarbon techniques, the recognition that some artifacts are poorly time-specific, and the understanding that site usage is as important in evaluating past lifeways as site frequency combine to give the Early Woodland a vitality that is often confined to discussions of the Late Archaic. The author hopes the audience feels, as she does, that the Early Woodland offers much to the archaeologist who is willing to look beyond what is not immediately discernable for the kernel of knowledge that lies hidden from view.

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Book Review: *Cape Cod and the Islands: The Geologic Story*, by Robert N. Oldale, 1992 Parnassus Imprints, East Orleans

Julie Brigham-Grette

Scientists and non-scientists alike have long been fascinated with the natural history of Cape Cod and its surrounding islands. What draws millions of people to its beaches and bays is the natural ambiance of the coast. Although it is well-known to the local inhabitants, most visitors are little aware of the long, dynamic battle that continues month after month, year after year between the land and the North Atlantic. As we know all too well, the coast is losing, and losing badly, as rising sea level and longshore currents continue to erode and redistribute the unconsolidated sediments left by repeated episodes of glaciation.

For both the professional observer and the layman, Robert Oldale has produced a delightful, informative paperback documenting the geological history of the Cape. This effort, based on Oldale's extensive field experience and scholarship as a senior member of the US Geological Survey, traces the paleogeography of the region through time. He begins by briefly describing the oldest rocks. The bulk of the chapters, however, sequentially focus on the Quaternary history of the Cape, the cause and effect of Holocene sea level rise, and most importantly, the modern surficial and geophysical processes that continually modify the coastline.

Although the text is broken into twenty-four brief sections, I have chosen to view the book as a series of chapters each addressing four large themes. The first portion of the book discusses basic principles and tools used by geologists for interpreting earth history. These include discussions on how to read topographic maps, how rocks and sediments are dated, and the concept of geologic time. This is followed by a description of the bedrock geology that provides the "foundation," as he refers to it, for the glacial history and landforms that follow.

The second section of the book outlines the glacial history of the Cape. While attempting to give the reader an impression of what the region was like 20,000 years ago, Oldale carefully describes the variety of glaciogenic landforms and deposits typical of ice-marginal environments and commonly seen today in fossil form during excursions on the Cape.

The third section of the book outlines the rise of sea level during the last deglaciation and the modern processes that have sculptured the coast over the last few thousand years. Following a discussion of how sand is redistributed by longshore currents and wind, coastal elements including barrier islands, spits, dunes and salt marshes are described in terms of their origin and function. One concise section discusses soils and pedogenesis. Next is a chapter summarizing the Quaternary history of Cape Cod. This pulls together the "big picture," which is otherwise interwoven throughout portions of earlier sections.

The last section is a wake-up call to the vulnerability of the Cape and Islands to intermittent natural disaster, continual erosion and overdevelopment. Sections on earthquakes and storm surges are tempered by a discussion of daily tidal action and currents. The final section is important because it provides Oldale's perspective on the future of the Cape -- wise words from one with both a geologic and historical long term view, unlike most politicians, real estate developers and much of the general public.

I have few complaints on the content of the text. I was disturbed by the use of the terms Nebraskan and Kansan glaciations with reference to deposits on Martha's Vineyard on page 36. Although the early literature written on the Cape and Islands clearly made use of these terms, they have been functionally obsolete for over 12 years and were formally abandoned in 1986. The use of these terms here perpetuates the myth among laymen of the four-fold subdivision of glaciations during the Quaternary. The "politically correct" view is, of course, to refer to all earlier glaciations as Pre-Illinoian because the absolute age of these deposits is so poorly known. My only other concern about the book is the poor reproduction of many of the topographic maps and one or two of the figures. For example, the spiraling diagram in figure 5 depicting the subdivision of geologic time may make a great, large format, wall poster, but it should have been simplified and redrawn for reproduction as an 11x14 cm illustration.

Cape Cod and the Islands is a delightful book skillfully written for the enjoyment of non-scientists as well as a valuable general reference for professionals in the fields of archaeology, Quaternary geology, coastal managment and recreation. For the price, it is the type of book everyone will enjoy reaching for.

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